March 22, 2002

Scott Shewbridge El Dorado Irrigation District 2890 Mosquito Rd. Placerville, Ca 95667

*RE*: 184-FERC

As part of the relicensing of the El Dorado Hydroelectric Project, FERC 184-065 (Project 184), the El Dorado Irrigation District (EID) has contracted with ECORP Consulting, Inc. (ECORP) to conduct environmental studies in support of EID's application to the Federal Energy Regulatory Commission (FERC). One of the elements of the application involves the evaluation of project water supply operations and release flows on aquatic resources. Aquatic amphibians were identified as one of the resource groups that could potentially be affected by these flows. Thus, a study of sensitive amphibian species occurring within the Project 184 area is a component of the contract between EID and ECORP. This study addresses Section 4.0 of the Scope of Work dated September 24, 2001, and amended on October 19, 2001. Based on further direction from CDFG, and the availability of new research by Pope and Matthews (2001), we have amended our Scope of Work, primarily to extend MYLF survey area up to 2 km project-affected waters.

Please find enclosed the Draft Protocols for Conducting El Dorado Irrigation District Project 184 Amphibian Surveys. I prepared this document with the assistance of Tom Keegan, Stacia Hoover, and Scott Cashen. If you have any questions, please call me at (916) 782-9100.

Sincerely,

Peter Balfour, M.S. Vice President / Principal Biologist

CC: Richard Floch / Richard Floch and Associates

Attachment

# PROTOCOLS FOR CONDUCTING EL DORADO IRRIGATION DISTRICT PROJECT 184 AMPHIBIAN SURVEYS

(EL DORADO COUNTY, CALIFORNIA)

March 22, 2002

PREPARED FOR:
El Dorado Irrigation District
2890 MOSQUITO RD.
PLACERVILLE, CA 95667

## PROTOCOLS FOR CONDUCTING **PROJECT 184 AMPHIBIAN SURVEYS**

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## **TABLES**

Table 1 – Targeted special status aquatic amphibians within the FERC 184 Project Area

## **LIST OF ATTACHMENTS**

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Attachment B – Site Maps

March 22, 2002

Scott Shewbridge El Dorado Irrigation District 2890 Mosquito Rd. Placerville, Ca 95667

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Sincerely,

**ORIGINAL SIGNED** 

Peter Balfour, M.S. Vice President / Principal Biologist

CC: Richard Floch / Richard Floch and Associates

Attachment

#### 1.0 INTRODUCTION

As part of the relicensing of the El Dorado Hydroelectric Project, FERC 184-065 (Project 184), the El Dorado Irrigation District (EID) has contracted with ECORP Consulting, Inc. (ECORP) to conduct environmental studies in support of EID's application to the Federal Energy Regulatory Commission (FERC). One of the elements of the application involves the evaluation of recreation and pulse flows of water on aquatic resources. Aquatic amphibians were identified as one of the resource groups that could potentially be affected by these flows. In particular, three special-status frog species California red-legged frog (Rana aurora draytonii) (CRLF), foothill yellow-legged frog (FYLF) (Rana boylii) and mountain yellow-legged frog (Rana muscosa) (MYLF) and one special-status toad species Yosemite toad (Bufo canorus) have the potential to occur within the 184 Project Area, and may be affected by the operation of the hydroelectric facilities. The three target frog species have been documented in, or in close proximity to the project area through surveys conducted by the U.S. Forest Service (USFS), California Department of Fish and Game (CDFG) and other sources. However, it is generally accepted that the Yosemite toad does not occur in the project area. The closest confirmed occurrence of the species is at Ebbetts pass, approximately 17 miles (10.5 km) southwest of the study area. It is possible, however, that some of the project area falls within a zone of hybridization between the Yosemite toad (B. canorus) and the western toad (B. boreas). As a result, 2002 field surveys will include documentation of toad sightings above 6,000 feet in the event toads in this region are later determined to be Yosemite toad hydrids. The regulatory status and habitat requirements of the four target amphibian species of the survey are summarized in Table 1.

Table 1 Target special-status aquatic amphibians within the FERC 184 Project Area

Species	Status	Approximate Elevation of Occurrence	General Aquatic Habitat Preferences (or requirements)
California red- legged frog	- Federal Threatened Species - CA Protected Species	< 5,000 ft (1,524 m)	Permanent ponds and slow- moving streams with pools with emergent or overhanging vegetation
Foothill yellow-legged frog  - Federal Species of Concern - USFS Sensitive Species - CA Species of Concern - CA Protected Species		< 4,000 ft (1,220 m)	Rivers and streams with cobble/boulder substrate and shallow riffle habitat
Mountain yellow-legged frog	<ul> <li>Federal Species of Concern (proposed to list as endangered)</li> <li>USFS Sensitive Species and</li> <li>CA Species of Concern</li> <li>CA Protected Species</li> </ul>	> 4,000 ft (1,220 m)	Slow moving runoff streams and wet meadows with emergent vegetation
Yosemite toad (Possible Hybrids)	<ul> <li>Federal Species of Concern (petition to list as endangered)</li> <li>-USFS Sensitive Species</li> <li>- CA Species of Concern</li> <li>- CA Protected Species</li> </ul>	> 6,000 ft (1,830 m)	Streams, lakes and wet meadows with vegetated and gently sloped shorelines

During the summer, fall, and winter of 2001, ECORP initiated the amphibian study by documenting baseline population and habitat data for the four target amphibian species within the Project 184 study area. Information on the distribution and habitat use of special-status amphibians in the Project Area will be necessary to evaluate potential impacts resulting from anticipated stream flow modifications (particularly short-term modifications). Results obtained during 2002 field surveys, scheduled to begin on April 1, 2002, will ultimately be used to evaluate the potential effects of project operations on special-status amphibians, and will facilitate management decisions that may affect amphibian populations (e.g., stream flow modifications).

The following study plan outlines the methods that will be used during 2002 field surveys. The plan provides the results of baseline amphibian investigations to date, and presents detailed maps depicting the locations of proposed survey areas. The plan augments ECORP's original Scope of Work dated September 24, 2001, and includes modifications pursuant to comments from the FERC collaborative.

### 2.0 STUDY AREA

For the purposes of this study, the Project 184 project area was subdivided into distinct reaches, which are described below and are depicted in Figure 1.

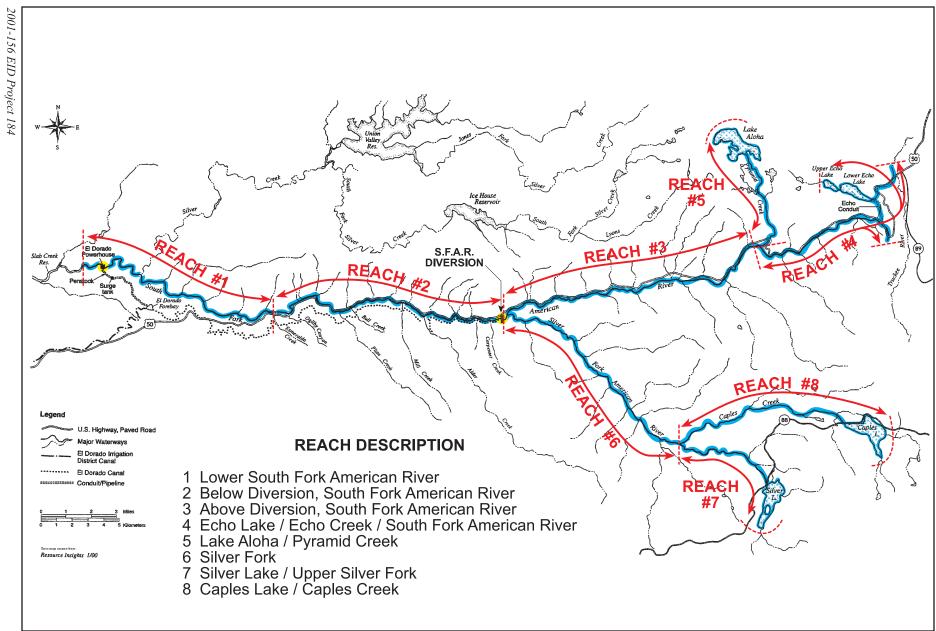


FIGURE 1. Project 184 - Survey Reach Locations

**Reach 1** - Lower South Fork American River (SFAR): the SFAR, beginning from the El Dorado Powerhouse and extending upstream to the confluence with Esmeralda Creek.

**Reach 2** - Downstream of Diversion Dam SFAR: the SFAR, beginning from the confluence with Esmeralda Creek and extending upstream to the SFAR Diversion.

**Reach 3** - Upstream of Diversion Dam SFAR: the SFAR, beginning from the SFAR Diversion and extending upstream to the confluence with Pyramid Creek.

**Reach 4** - Echo Lake and Upper SFAR: the SFAR, beginning from the confluence with Pyramid Creek and extending to the SFAR headwater. Reach 4 also includes the Echo Conduit, a 2 km wide band along the perimeter of both Upper and Lower Echo Lake, and Echo Creek (upstream a distance of 2 km from the confluence with Lower Echo Lake).

**Reach 5** - Pyramid Creek and Lake Aloha: Pyramid Creek, beginning from the confluence with the SFAR and extending upstream to Lake Aloha. Reach 5 includes the area within 2 km of Lake Aloha.

**Reach 6** -Silver Fork American River: the Silver Fork American River, beginning from the confluence with the SFAR and extending upstream to the confluence with Caples Creek.

**Reach 7 -** Upper Silver Fork AR and Silver Lake: Silver Fork American River, beginning at the confluence with Caples Creek and extending upstream to Silver Lake. Reach 7 includes the area within 2 km of Silver Lake.

**Reach 8** - Caples Creek and Caples Lake: Caples Creek from the confluence with the Silver Fork American River to Caples lake. Reach 8 includes the area within a 2 km of Caples lake.

#### 3.0 METHODS

#### 3.1 Site Selection

#### 3.1.1 California Red-legged Frog Site Assessment

Surveys of the Project 184 project area will involve surveys specifically designed to detect the CRLF within areas considered to be suitable breeding habitat. Many of these areas are located on private property and, as such, may not be accessible. The USFWS has indicated that CRLF surveys will be a required component of the amphibian study plan, and requested that a CRLF site assessment be conducted in advance of survey efforts. The assessment was conducted to document and characterize the extent of regionally-occurring habitats representing known or potential habitat for the CRLF per *Guidance on Site Assessment and Field Surveys for California Red-legged Frogs*,

dated February 18, 1997) (USFWS 1997). Methods used in our investigation are summarized in the subsections below.

Per USFWS assessment guidelines, the first level of evaluation involved analyses of all documented locality data for the project region, specifically within 5 miles (3.1 km) of the project area. The second level of analyses involved an evaluation of known frog occurrences and potential habitat within one mile (1.6 km) of the project site. Aerial photographs and topographic maps of the entire Project 184 project site were reviewed to determine the approximate extent of areas within the project vicinity that could potentially provide habitat for the CRLF. When possible, habitat areas were differentiated by type (e.g., stock pond, spring) via photograph signature analyses and/or by using information provided on USGS quadrangles. The locations of these areas were then delineated on USGS 7.5 minute topographic quadrangle base maps. The results of the assessment are summarized below:

The lower reaches of the Project 184 project area are located near, but outside of, formally designated Critical Habitat (Unit 3) for the CRLF. The species is currently known to occur within the Weber Creek watershed, south and west of Project 184. Frogs are known to occur in Spivey Pond near Pollock Pines, and in North Fork Weber Creek upstream of the Snows Road crossing. Spivey Pond is located within 5 miles of the Project 184 Project area (Figure 2); the North Fork Weber Creek is located outside of the 5-mile project area radius. Historical records of the CRLF also have been documented in South Fork Weber Creek at Snows Road and in Weber Creek in the vicinity of Placerville.

California red-legged frogs are not known to occur within the Project 184 project area, however, potentially suitable habitat occurs within 1 mile. Selected survey sites for CRLF discussed earlier, consist of ponds (natural or man-made), springs, and seeps below 5,000 feet (1,524 m) elevation, and occurring within 1.0 mile (1.6 km) of Project affected river reaches. Figures 3a-e identify potential habitat areas, primarily ponds, seeps, and springs that could serve as potential breeding areas. The actual habitat quality of these areas, however, is not known. Most of these areas occur on private property and, as such, may not be accessible. Areas for which access is secured will be surveyed using current USFWS protocols (USFWS 1997).

FIGURE 2. Known Occurrences of California Red-legged Frogs

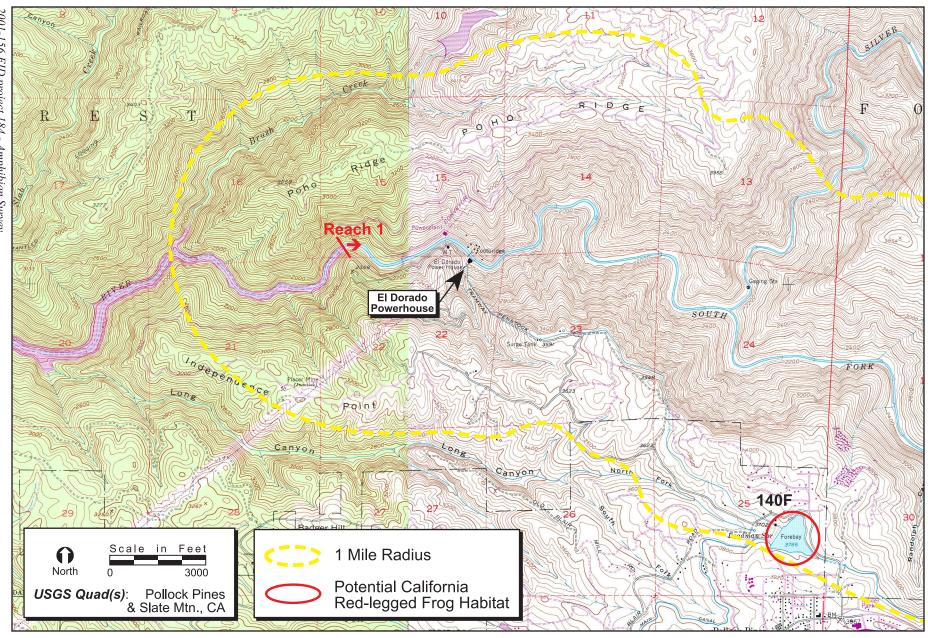


FIGURE 3-A. Potential California Red-legged Frog Habitat

FIGURE 3-B. Potential California Red-legged Frog Habitat

FIGURE 3-C.Potential California Red-legged Frog Habitat

FIGURE 3-D. Potential California Red-legged Frog Habitat

FIGURE 3-E. Potential California Red-legged Frog Habitat

## 3.1.2 Foothill Yellow-legged Frog, Mountain Yellow legged Frog, and Yosemite Toad

The process of site selection began with a thorough literature and information search to determine species-specific habitat requirements and known occurrences within the Study Area. A number of resources were used, including published literature, the California Fish and Game Natural Diversity Data Base (CNDDB), local resource agency biologists, and species experts.

Based on information gathered on species-specific habitat criteria, including elevation ranges, we identified areas of potential habitat for the three special-status amphibian species in the Project area. High-resolution aerial photographs and USGS topographic maps were used to identify and characterize aquatic habitats, and to determine their potential to provide suitable habitat for the target species. Distinct sites were selected through photographic and topographic interpretation, and delineated onto a map. A number of ground-level site assessments were conducted at many locations during the fall of 2002 to confirm the suitability of the sites for the target species, and to obtain information regarding access and ownership.

In addition, information on species occurrences in the Project area was obtained from the USFS, CDFG, and the California Natural Diversity Database (CNDDB), and all occurrences were delineated on the survey locations map. The presence of MYLF is well documented at many locations within the Project area (e.g., Lake Aloha). The California Department of Fish and Game (Stafford Lehr, personal communication) has indicated that survey effort may be reduced within areas of historic sightings based upon EID's acceptance of the data. We are presently awaiting USFWS's concurrence on this matter.

Selected survey sites for CRLF discussed earlier, consist of ponds (natural or man-made), springs, and seeps below 5,000 feet (1,524 m) elevation, and occurring within 1.0 mile (1.6 km) of Project affected river reaches. Potential survey sites for FYLF consist of suitable river and stream habitat below 4,000 feet (1,371 m) elevation, and occurring within 0.5 miles (0.8 km) of Project affected river reaches. Survey sites for the MYLF are located at lake, stream, and wet meadow habitats above 4,000 feet (1,220 m), and occurring within 1.25 miles (2.0 km) of Project affected lakes, rivers and streams. Surveys for Yosemite toads will concentrate on wet meadows and ponds above 6,000 feet. All selected survey sites are summarized in Appendix A and depicted in Appendix B.

## 3.2 Field Surveys

Surveys for CRLF will be conducted according to the USFWS's *Guidance on Site Assessment and Field Surveys for California Red-legged Frog* (1997). Field surveys for the remaining species will consist of visual encounter surveys, and will include concurrent habitat assessments of all sites. Surveys for FYLF, MYLF and Yosemite toads will be conducted following protocols outlined in one or more of the subsequent references: PG&E (2001), Lind (1997), Thoms et al. (1997), Fellers and Freel (1995), and Crump and Scott (1994). In addition, we have incorporated resource agency recommendations (i.e., USFWS, CDFG), and current MYLF dispersal data (Pope and Mathews 2001), to develop species-specific survey methodologies.

## 3.2.1 Survey Protocol for California Red-legged Frog

Survey methods will follow those described in the USFWS's *Guidance on Site Assessment and Field Surveys for California Red-legged Frogs* (dated February 18, 1997)(USFWS 1997). In accordance with these guidelines, two diurnal surveys and two nocturnal surveys will conducted at each potential habitat area. All previously selected and accessible sites will be surveyed for the presence of CRLFs. Specific survey methodologies are described below:

#### **Survey Procedures**

Surveyors will walk along the entire shore visually scanning all shoreline areas with binoculars. In water bodies covered with floating vegetation, both the shoreline and surface of the water will be scanned. Surveyors will avoid crushing potential frog cover such as rootballs and overhanging banks, and avoid disturbing sediments and vegetation that may harbor egg masses or larva. When possible, and without causing harassment, photographs will be taken of CRLFs observed during surveys. Day surveys will be conducted on clear, sunny days. Night surveys to detect eye shines will be conducted on warm still nights between one hour after sunset and 12 midnight. A flashlight or headlamp powered by one 6-volt or four to six D-cell batteries will be used to assist surveyors with detection efforts.

**Schedule** 

Visual encounter surveys will be conducted at selected sites four times, twice during the day and

twice at night, between May 1 and November 1, 2002. Before repeating surveys at a given site,

surveyors will wait at least twenty-four hours.

Reporting Results of CRLF Field Surveys

Any information on California red-legged frog distribution resulting from field surveys will be sent

to the CNDDB, administered by the CDFG. Copies of the CNDDB form will be submitted to both

the USFWS and CDFG. Results of CRLF surveys will be summarized in the final Project 184

Amphibian Survey document.

3.2.2 Survey Protocol for Foothill Yellow-legged Frog and Mountain Yellow-legged Frog

Visual Encounter Survey Procedures

Teams of two surveyors each will conduct all surveys following amphibian sampling procedures

described in Fellers and Freel 1995. This includes using binoculars to scan ahead for frogs basking

or sitting on banks and exposed areas. When possible, surveyors will wade through the water and

randomly use a dip net in aquatic microhabitats such as beneath overhanging banks and within

floating and emergent vegetation while being cautious to avoid trampling egg masses. Surveyors will also look for flushed frogs, which may occur on the periphery, and will occasionally wave nets

or sticks over bank vegetation to flush hiding frogs.

Variations in survey approach will be dependent upon the type of habitat being surveyed (e.g.,

river, stream, pool, wet meadow, etc.), and the quality and extent of available habitat. Differences

in survey approach are briefly addressed below. The specific survey area of each aquatic feature

will be based on the following guidelines:

• Wet Meadows – Distinct aquatic habitat units contained within the meadow (e.g., stream,

pond, etc.) will be searched visually, and dip-netted along their perimeter. The deeper

portions of water bodies will be scanned with binoculars. No more than two-person hours

will be spent on each significant water body. When not following an obvious channel,

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surveyors will meander through the meadow making approximately 10 m wide passes, while searching for standing water and shallow potholes to survey.

River and Tributary Sites – Two individuals, working in tandem, will follow linear or meandering transects to search along river and stream sections. When possible, river surveys will begin at the downstream end of the site, and continue along one bank, or cross across the river if the amphibian habitat is contiguous (i.e. the river is shallow enough that frogs can cross). If suitable habitat is present on the opposite bank, and is not contiguous, surveyors will cross the river and survey the opposite bank once the first bank is completed. When surveyors encounter areas lacking suitable amphibian habitat they will cease the survey, and progress to the next survey location.

Tributary streams that are narrow will be surveyed in one direction, starting downstream and moving upstream (if possible). Two surveyors will search both banks simultaneously. Larger streams, which do not permit surveying both banks simultaneously, will be surveyed using the method described for rivers. Areas lacking suitable amphibian habitat will be bypassed and searching will resume once appropriate habitat is encountered. The distance and locations of suitable (searched) and unsuitable habitat will be mapped on topographic maps or site sketches.

- *Ponds* Small ponds will be surveyed by wading along the perimeter and netting (dip-net) in the shallow waters. Larger ponds will be sampled using an approach that differentiates three survey zones: 1) the waterline where water and upland meet, 2) the shallow water zone- the waterline out to a depth that can be waded safely (i.e., up to 1 m deep), and 3) the shore zone- the area surrounding the pond within 3 m of the waterline. Surveyors, working either in tandem or individually, will search each zone for a maximum search time of two man-hours (one hour per surveyor).
- Lakes Lake survey methods will depend upon the extent of the habitat. Small lakes will
  be surveyed along their entire perimeter. For large lakes, surveys will be conducted at all
  suitable locations along the lake perimeter. Locations of suitable (searched) and
  unsuitable habitat will be mapped on topographic maps or site sketches.

Survey Schedule

• Foothill Yellow-legged Frog -One survey will be conducted between April and September

to identify FYLF adults, larva, or egg masses. Because egg laying is generally initiated

when spring runoff flows begin to decrease, and when water temperatures reach 12° to 15°

C, surveyors will monitor local conditions to detect the best time to initiate surveys. If

larva or egg masses are encountered during the initial site visit, a second survey will be

conducted the site will be resurveyed 2 to 4 weeks later.

• Mountain Yellow-legged Frogs - One survey for MYLF adults and larvae will be

conducted between July and September. Generally, overwintering MYLF tadpoles become

active and adults emerge from hibernation sites soon after the ice begins to melt in streams,

lakes, and ponds. Accordingly, snowmelt and river and stream conditions will be

monitored to determine the most appropriate time to commence surveys. If larva or egg

masses are encountered during the initial site visit, the site will be resurveyed 2 to 4 weeks

later.

3.2.3 Survey Protocol for Yosemite Toad

Visual Encounter Surveys Procedures

Surveys will be conducted using a modified approach to the Thoms et al (1997), and Fellers and

Freel (1995) methodology. During YT searches, a team of two surveyors will visually scan the

survey area for exposed YT, and use a long-handled dip-net net to search through emergent

vegetation and appropriate microhabitats for toads and tadpoles.

The survey approach will depend on the type and extent of aquatic habitat being surveyed (e.g.,

lentic sites, ponds, wet meadows). A brief summary of survey approaches specific to aquatic

habitat type was provided in the previous section, for MYLF and FYLF surveys.

Survey Schedule

One YT survey will be conducted at each site between April and September depending on local

environmental conditions. To determine the most appropriate time to initiate surveys, we will

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monitor the spring snowmelt to detect the formation of snowmelt ponds within the meadows. If larvae or egg masses are encountered during the initial site visit, the site will be resurveyed 2 to 4

weeks later.

3.2.4 General Procedures For All Amphibian Surveys

Recording Data

Aerial photographs will be used to denote the location of all encountered target species, site

boundaries, and the search patterns used. If aerial photographs are not available, the survey site

will be drawn on the back of the data sheet and onto topographic maps. The length of survey

transects, along with the search time, will be recorded onto standardized data sheets.

Data on target species encountered during surveys, including the individual's size, sex, lifestage,

and behavior, will be recorded onto standardized survey data sheets. Where possible, detected

target species will be photographed to document their location relative to aquatic features. In

addition, weather conditions at the time of the encounter, and the specific microhabitat parameters

where the encounter took place, also will be recorded. Such parameters include substrate type,

distance and orientation of sighting from shore, water temperature, depth, velocity and pH. The

location of the encounter will be recorded by GPS.

During the course of amphibian surveys, the presence of western pond turtles (Clemmys

marmorata) (WPT) will be recorded. Surveyors will use binoculars and be vigilant for basking

turtles at all amphibian survey sites. When WPT sightings occur, microhabitat data will be

documented, and the location of the encounter will be recorded by GPS. All other non-target

reptiles and amphibians observed during visual encounter surveys will be recorded on data sheets;

however, the locations will not be recorded digitally.

**Analysis Methods** 

Based on data collected during this study and other available information, descriptions of the

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following will be prepared for each species:

1. general physical and biological characteristics of survey areas

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2. specific characteristics of each selected monitoring site

3. location and distribution of each life stage encountered

4. microhabitat conditions where each life stage was encountered

Maps will be prepared showing the locations of potential habitat, selected monitoring sites, and life stages of each species encountered. In addition, relative abundance data will be calculated at all sites for each life stage to facilitate comparisons of relative abundance between sites and between monitoring events.

Field Documentation and Quality Assurance/ Quality Control Procedures

Standardized field data sheets will be used during the study and will be reviewed for completeness and accuracy at the end of each survey, prior to leaving a survey site.

**Products** 

We will generate a final technical report, available both electronically and in hard copy, at the completion of the amphibian study. The report will present presence/absence data, locality data including GPS coordinates of encounters, and site habitat assessments.

### 4.0 REFERENCES

- U.S. Department of the Interior, Fish and Wildlife Service. 1997. Guidance on Site Assessment and Field Surveys for the California Red-legged Frogs, U.S. Fish and Wildlife Service, dated February 18, 1997.
- Crump, M.L. and N.J. Scott, Jr. 1994. Visual Encounter Surveys. Pages 84-92 in W.R. Heyer,
   M.A. Donnelly, R.W. McDiarmid, L.C. Hayek, and M.S. Foster, eds. Measuring and
   Monitoring Biological Diversity: Standard Methods for Amphibians.
- Fellers, G. M. and K. L. Freel. 1995. A standardized protocol for surveying aquatic amphibians. National Biological Service Cooperative Park Studies Unit, University of California Division of Environmental Studies, Davis, CA. Technical Report No. NPS/WRUC/NRTR 95-01 (UC CPSU TR # 58).
- Lind, Amy. 1997. Survey Protocol for Foothill Yellow-Legged Frogs (*Rana boyli*i) in Streams. USDA Forest Service, Pacific Southwest Research Station, Arcata, CA. DG: S27L01A.
- Pacific Gas and Electric Company. 2001. Survey protocols, standard operating procedures, and data sheets for amphibian surveys and site habitat assessments. May 2001. Unpublished.
- Thoms, C., C.C. Corkran, and D.H. Olson. 1997. Basic Amphibian Survey for Inventory and Monitoring in Lentic Habitat. Pages 35-46 *in* D. H. Olson, W.P. Leonard, and R.B. Bury, eds. Sampling Amphibians in Lentic Habitats: Methods and Approaches for the Pacific Northwest. Northwest Fauna 4. Society for Northwestern Vertebrate Biology, Olympia, WA.

EID Project 184 Amphibian Survey Sites

Attachment A. EID Project 184 Amphibian Survey Sites


Reach/Site No.	<u>Habitat</u>	Site I	Site Length		<u>Area</u>	<b>Location</b>
		mi	km	$mi^2$	$km^2$	
Reach 1- Lower Sou	ıth Fork American	River				
105R	River	0.25	0.40	_	_	downstream of Dam
110R	River	0.25	0.40	_	_	-
115T	Tributary	0.75	1.21	_	_	Silver Creek
120R	River	0.73	0.80	_	_	-
125T	Tributary	0.75	1.21	_	_	Soldier Creek
130R	River	0.73	0.80	-	-	Soldier Creek
135R	River	0.30	0.40	_	-	-
140F	Forebay	1.25	2.01	-	-	-
140F 145P	Pond	0.25	0.40	-	-	-
150S		0.25	0.40	-	-	-
	Spring			-	-	- Carrier V-11
155S	Spring	0.25	0.40	-	-	Spring Valley
160S	Spring	0.25	0.40	-	-	Van Vleck
TOTAL SITES: 12	TOTAL	L: 5.50 mi	8.85 km	-	-	
Reach 2 - Downstre	am of Diversion Da	m SFAR				
205DT	Diverted Tributary	1.25	2.01	-	-	Esmeralda Creek
210DT	Diverted Tributary	1.25	2.01	-	-	Ogilby Creek
215T	Tributary	0.75	1.21	-	-	Short Place
220R	River	1.00	1.61	-	-	Maple Grove
225T	Tributary	1.25	2.01	-	-	Plum Creek
230DT	Diverted Tributary	1.25	2.01	-	_	Bull Creek
235R	River	0.50	0.80	_	-	-
240R	River	0.25	0.40	_	-	While Hall
245DT	Diverted Tributary	1.25	2.01	_	_	Mill Creek
250DT	Diverted Tributary	1.25	2.01	_	_	Alder Creek
255R	River	0.50	0.80	_	_	-
260R	River	0.25	0.40	_	_	29-mile Guard Station
265DT	Diverted Tributary	0.75	1.21	_	_	No-Name Creek
270DT	Diverted Tributary	0.75	1.21	_	_	Carpenter Creek
275S/P	Spring and Ponds	0.75	0.40	_	_	White Meadow
280P	Ponds	0.50	0.80	_	_	white weadow
285S	Spring	0.30	0.80	-	-	Short Place
290S	Spring	0.16	0.25	-	-	-
TOTAL SITES: 18		L: 13.31 mi		_	_	
			21.42 Km			
	of Diversion Dam		0.50			
305R	Tributary	0.31	0.50	-	-	-
310T	Tributary	1.24	2.00	-	-	-
315T	Tributary	1.40	2.25	-	-	Station Creek
320T	Tributary	1.40	2.25	-	-	Forni Creek
325T	Tributary	1.24	2.00		-	Cody Creek
TOTAL SITES: 5	TOTAL	: 5.59 mi	9 km	-	-	

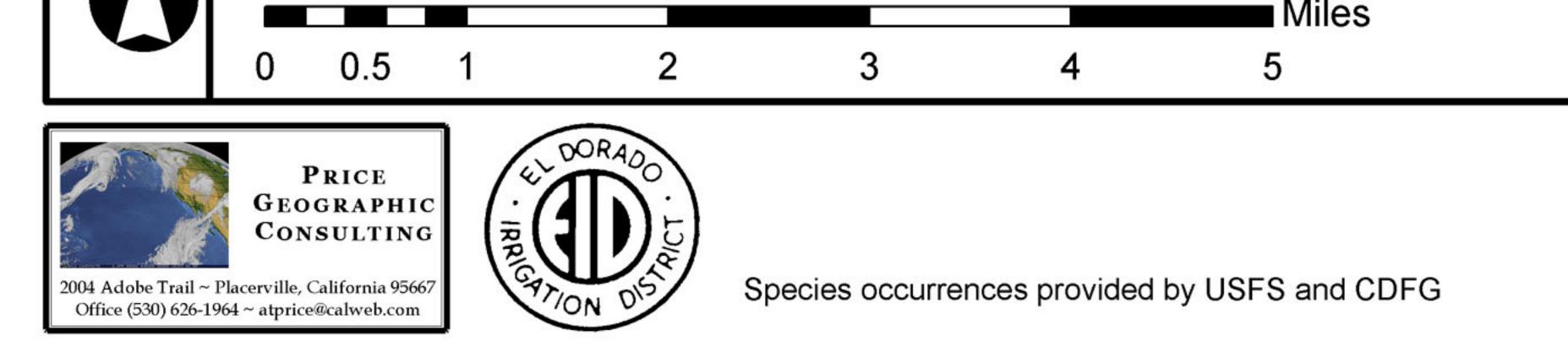
Reach 4 - Echo Lake and Upper SFAR							
405T	Tributary	1.40	2.25	-	-	Sayles Canyon	
410T/L	Tributary and Lake	1.40	2.25	-	-	Bryan Creek and lake	
415M/L	Meadow and Lake	-	-	0.39	1.00	Lake Audrian and meadow	
420T/M	Tributary and Meadow	0.62	1.00	-	-	Huckleberry Flat	
425L	Lake	0.31	0.50	-	-	-	
430DT	Diverted Tributary	0.62	1.00	-	-	Echo Creek	
435M	Meadow	-	-	0.02	0.06	Osgood Swamp	
440T	Tributary	0.62	1.00	-	-	Camp Harvey	
455LP	Lakes	5.12	8.24	-	-	Echo Lakes	
TOTAL SITES: 9	TOTAL:	10.09	16.24	0.41 mi <sup>2</sup>	1.06 km <sup>2</sup>		
Reach 5 - Pyramid Cro	eek and Lake Aloh	10.09					
505R	River	1.75	2.82	_	_	Pyramid Creek	
510L/R	Lake and River	1.50	2.41	_	_	Avalanche and Pitt Lakes and Pyramid Creek	
515R	River	0.75	1.21	_	_	Pyramid Creek	
520L	Lake	2.00	3.22	_	_	Channel and American Lake	
525LP	Lake	7.17	11.54	_	_	Aloha Lake and Saddle Dam lakes	
5 <b>2</b> 521		,,	11.0.			Thoma Build und Suddie Built Miles	
TOTAL SITES: 5	TOTAL:	13.17 mi	21.19 km	-	-		
Reach 6 - Silver Fork	American River						
605R	River	0.75	1.21	-	-	SFAR/Silver Fork AR Confluence	
610T	Tributary	1.50	2.41	-	-	Beanville Creek	
615R	River	2.00	3.22	-	-	China Flat	
620T	Tributary	1.40	2.25	-	-	Middle Creek	
625T	Tributary	0.93	1.50	-	-	Long Canyon	
630R	River	1.50	2.41	-	-	-	
635T	Tributary	1.50	2.41	-	-	Hell's Delight	
640T	Tributary	1.50	2.41	-	-	Bark Shanty	
645T	Tributary	0.93	1.50	-	-	Sherman Canyon	
TOTAL SITES: 9	TOTAL:	12.01	19.33	-	-		
Reach 7 - Upper Silver	· Fork AR and Silv	er Lak	e				
705R	River	0.75	1.21	_	_	-	
710M	Meadow	0.75	-	0.12	0.32	Silver Fork Meadow	
715R	River	1.50	2.41	-	-	-	
720T	Tributary	2.00	3.22	_	_	Oyster Creek	
750LP	Lake Parimeter		8.82	_		Silver Lake	
750LP 751IT	Inlet Tributary	5.48 1.24	2.00	-	-	(Hidden Lake)	
75111 752IT	Inlet Tributary	1.24	2.00	-	-	(Summit Meadow Lake)	
75211 753IT	Inlet Tributary Inlet Tributary	1.24	2.00	-	-	(Camp Silverado)	
	•			-			
TOTAL SITES: 8	TOTAL:	13.46 mi	21.66 km	0.12 mi <sup>2</sup>	0.32 km <sup>2</sup>		

Reach/Site No.	<u>Habitat</u>	Site I	_ength	Site .	Area	Location		
		mi	km	mi2	km2			
Reach 8 - Caples Creek and Caples Lake								
805M	Meadow	-	_	0.12	0.32	Jack Schneider Meadow		
810M	Meadow	-	-	0.03	0.08	(spring)		
815M	Meadow	-	-	0.06	0.16	Government Meadow		
820M	Meadow	-	-	0.03	0.08	Convict Meadow		
821T	Tributary	1.24	2.00	-	-	-		
822R/M	River and Meadow	_	-	0.15	0.40	-		
825L	Lakes	1.25	2.01	-	-	-		
830L	Lakes	0.25	0.40	-	-	-		
835L	Lakes	0.75	1.21	-	-	-		
840L	Lake	0.50	0.80	-	-	-		
845L	Lake	0.50	0.80	-	-	-		
850L	Lake	0.60	0.97	-	-	Lake Margaret		
855L	Lake	0.50	0.80	-	-	-		
860L	Lake	0.50	0.80	-	-	-		
865L	Lake	0.50	0.80	-	-	-		
870R/M	River and Meadow	-	-	0.12	0.32	Caples/Spillway Confluence		
875SC	Spillway Channel	0.50	0.80	-	-	Spillway Channel		
880R	River	0.50	0.80	-	-	(Caples Lake/Caples Creek		
885L	Lakes	0.50	0.80	-	-	(HWY88 Look Out Point)		
890M	Meadows	-	-	0.03	0.08	(HWY 88)		
895LP	Lake Parimeter	5.99	9.64	-	-	Caples Lake		
896IT	Inlet Tributary	1.24	2.00	-	-	Woods Creek		
897IT	Inlet Tributary	1.24	2.00	-	-	Emigrant Creek and Emigrant Lake		
TOTAL SITES: 23	TOTAL:	16.56 mi	26.65 km	0.54 mi <sup>2</sup>	1.45 km	2		

## ATTACHMENT B

Site Maps





EID Project 184 Amphibian Survey Map

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS